

operation is an inch or more distal to the bone end, it becomes apparent how extensive is the power of the intact hamstring muscles to retract the posterior flap. In a short time the femur is lodged securely in the patellar fossa, thus assuring great stability to the soft parts of the stump. There is excellent end-bearing because of the presence of the rectus femoris tendon, the elements of the prepatellar bursa, and of tough skin over the bone end. The patient is able to extend his stump powerfully, a requisite in any thigh amputation.

In my series healing has taken place in four weeks on the average. In our last three patients in whom the skin edges between the primary suture points were approximated secondarily by additional clips, healing was complete at the end of a week.

#### CONCLUSIONS

Mortality from thigh amputation will be decreased if the technique as outlined be followed meticulously. The factors which lower the mortality rate are: lessened shock from adequate control of blood supply and from section of muscles only in their tendinous insertions; diminished incidence of pneumonia from a lessened period of recumbency; decreased tendency to anaerobic or aerobic infection, because there are no structures under tension, this being the result of long flaps and no suturing; the serum produced in the wound has ready exit; and the lessened incidence of re-amputation which in itself carries a considerable mortality. Reamputation has not been necessary in any of our cases, and should not be because of the adequacy of long anterior and posterior flaps.

Thus far fourteen amputations have been performed according to this method. The majority of these patients were over seventy years of age. One has died, a mortality of about 7 per cent. This man was eighty-four years of age, and died eleven days after his operation from a coincidental pneumonia. His amputation wound was fairly clean and had united partially. His amputation was the second in our series. At the time his operation was performed, we did not know that we could get our patients up practically immediately. It is possible that his pneumonia could have been averted by getting him into a wheelchair on his second postoperative day, the procedure we have adopted in all later cases. Thirteen out of these fourteen cases were amputated for arteriosclerotic or diabetic gangrene. One patient was amputated for intractable compound fracture near the knee.

The mortality statistics of thigh amputation vary widely. Much depends on the condition of the patients. The best of the larger series show a death rate of 15 per cent, while the series in the city hospitals and relief homes show much higher figures. Prior to the development of our operation, the mortality of thigh amputations on our service in the San Francisco Hospital exceeded 50 per cent.

450 Sutter Street.

#### DISCUSSION

HUGH JONES, M. D. (201 Medical Office Building, Los Angeles).—Doctor Callander's operation promises to be a valuable advance in the surgical care of gangrenous lower

extremities. I am of the opinion that an extended series of cases will bear out the soundness of the anatomical reasons for this type of operation, first in regard to the circulation of flaps and also in the severing of muscles at their insertions rather than through fleshy bellies. There is a distinct advantage in gaining a longer stump, as well as an end-bearing stump. The avoidance of open paths for spread of anaerobic infection is another point worthy of emphasis.

This makes us realize that our knowledge of surgical anatomy is certainly incomplete, and that we should ever be critical in accepting without question our heritage of the classical operations.

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E. W. CLEARY, M. D. (490 Post Street, San Francisco). Doctor Callander is to be congratulated upon developing this method of lower thigh amputation. An end-bearing stump is a very great advantage. For this reason the Gritti-Stokes amputation has been effective. The Gritti-Stokes technique is, however, sufficiently elaborate to carry with it relatively large limitations as to selection of suitable cases and, notwithstanding careful selection, a too high percentage of imperfect healings. Doctor Callander's operation commends itself because of simplicity and consequent wider range of applicability. His technique is about as near atraumatic as an amputation of the thigh could possibly be. Muscles are not cut, a large weight-bearing surface is preserved, the uncertainty contingent upon bony union of the retained patella has been cleverly avoided, and the use of ligatures and sutures has been brought to an irreducible minimum.

This amputation is, I believe, a significant improvement over all previously devised low-thigh amputations.

#### PATHOLOGIC FINDINGS AT THE PARS CARDIA OF THE STOMACH\*

By JACOB ABOWITZ, M.D.  
Los Angeles

DISCUSSION by Louie Felger, M. D., Los Angeles; H. H. Lissner, M. D., Los Angeles.

THIS presentation aims to call attention to pathologic conditions in the pars cardia of the stomach and the relatively frequent changes occurring in the organs and structures adjacent to it. These changes, as observed fluoroscopically or radiographically, often give the first clue to pathologic conditions at the pars cardia, and may be of great aid in establishing a diagnosis.

#### CHANGES IN ADJACENT STRUCTURES

*The Diaphragm.*—Changes in position and excursion of the diaphragm often indicate pathology either above or below the diaphragm.

*Cardiac End of the Esophagus.*—The cardiac end of the esophagus, during deglutition, tapers down at the introitus of the stomach, and opens and closes intermittently, although a true sphincter does not exist there. When pathology is present this sphincteric action may be lost, and the cardiac end of the esophagus may be either gaping or contracted, depending on the nature of the lesion. The conical shape may become distorted and its lumen eccentrically displaced. These changes may be observed fluoroscopically with the aid of a barium mixture. Occasionally, when pathology is present, a speck of barium may be present at the

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cardiac end long after the barium meal has been ingested.

*The Gas Bubble (Magenblase).*—There is almost always present a small amount of gas in the stomach. When the patient is in the upright position, the gas bubble rises to the pars cardia. In this position it is pear-shaped, point down. When the distal end of the gas bubble, on a fasting stomach or six hours after a barium meal, is replaced by a fluid level more than half an inch in width, it is an indication of gastric hypersecretion, or hyperacidity. This hypersecretion may be due to either reflex or local irritation.

A large gas bubble often indicates erophagia. Distortion of the shape or outline of the gas bubble may be produced by a new growth, extrinsic or intrinsic, of the pars cardia. A large gas bubble, by raising the left diaphragm, may produce cardiac symptoms. In diaphragmatic hernia the gas bubble is usually absent at the pars cardia.

Occasionally the pars cardia, especially its lesser curvature, is displaced laterally by an enlarged left lobe of the liver, while a distended splenic flexure displaces the greater curvature mesially.

#### PATHOLOGIC CONDITIONS FOUND IN THE PARS CARDIA

*Carcinoma of the Pars Cardia.*—In carcinoma of the pars cardia we invariably find the left diaphragm elevated, and its excursions decreased or absent. The gas bubble is distorted and encroached upon by a tumor mass, either on its left or right side, depending on whether the carcinoma is situated on the lesser or greater curvature. When the carcinoma invades the anterior or posterior wall, the tumor may be visualized through the gas bubble. As a rule, in carcinoma of the stomach there is hyosecretion, and no fluid level is present at the tip of the gas bubble. Normally, peristalsis is not well marked at the pars cardia; when carcinoma is present, peristalsis is entirely absent. Normally, the ingested barium mixture runs down the lesser curvature in a narrow stream; with carcinoma of the pars cardia this stream is deviated to the left, or divided into several irregular branches. A speck of barium often remains for a considerable time at the cardiac end of the esophagus. The filling defect in the stomach is best observed in the horizontal posture, when the pars cardia is completely filled with barium mixture. Carcinoma of the pars cardia of the stomach often invades the cardiac end of the esophagus, and vice versa when there is carcinoma of the cardiac end of the esophagus. A note of warning may here be sounded that the splenic flexure, when situated behind the pars cardia and when filled with intestinal contents, or distended with gas, produces a transitory filling defect in the barium-filled stomach simulating the filling defect of a carcinoma. The same is true when a large spleen is present. A reëxamination at a later date usually clears the question.

*Diaphragmatic Hernia.*—I shall not elaborate on this subject which became so popular of late through the lay press. I shall mention only a few points which may be of interest to the profession.

In our routine gastro-intestinal examination of 1,100 patients, we have found diaphragmatic hernia in two per cent of the cases. Most of the herniae found are of the esophageal type; that is, the hernia enters the thoracic cavity through the esophageal hiatus in the diaphragm. A history of either a recent or an old injury was elicited from practically all of our patients, although the patients did not attribute their gastro-intestinal symptoms to that injury. Occasionally the isthmus connecting the hernia with the body of the stomach becomes ulcerated and bleeds, probably produced by the constriction of a small hernial opening. Three of our patients were so anemic that transfusions were indicated. In one of them a penetrating gastric ulcer was found at the isthmus of the hernia. Presuming that the small opening in the diaphragm produced the ulcer, an operation was performed to widen it, with subsequent marked improvement in the patient's condition. All the cases were discovered during fluoroscopic examination.

To demonstrate the hernia on the film we found a modified knee-chest position most satisfactory. Manual pressure on the barium-filled stomach on deep inspiration best demonstrates the condition. Occasionally, the horizontal position shows it better than the vertical. Three of our cases were recognized incidentally by observing the gas bubble behind the heart shadow. Two cases were discovered on genito-urinary films; the third, fluoroscopically, while administering a barium enema. I believe the visualization of the gas bubble behind the heart shadow is a valuable and unmistakable roentgenologic sign of a diaphragmatic hernia. To my knowledge, this observation has never been described before.

*A Pouch at the Pars Cardia.*—Not infrequently a pouch is present at the pars cardia on the lesser curvature below the esophageal hiatus. It is best visualized fluoroscopically in the right-oblique vertical position, when the stomach is only partly filled with the barium mixture. Then two fluid levels are seen: one in the pouch and one in the lower end of the stomach. This condition is variously described in medical literature as a "cascade stomach," a "shelving portion" of the stomach, or "cup and spill" deformity. The clinical significance of it is that it occasionally becomes inflamed or ulcerated; then the symptoms are the same as those of a gastric ulcer. The subjective symptoms are often a feeling of heaviness in the epigastric region after meals, probably due to the stasis of food in the pouch. One patient complains that she is awakened from her sleep by a drumming sound in the epigastric region. This sound is synchronous with the pulse and is produced by the heart apex beating against a gas-distended pouch.

*Erophagia.*—Erophagia is not an uncommon condition. It is often observed fluoroscopically. Occasionally it produces pressure on the heart from below. Recently one of our patients, a highly neurotic woman, suffered from periodic attacks of vomiting. Fluoroscopically, we noticed that she subconsciously swallowed so much air that there was very little room left in the stomach for food, and eructation of the gas produced vomiting.

## IN CONCLUSION

In conclusion, may I say that, although the pars cardia is considered the silent area of the stomach, and only about five per cent of pathology occurs there as compared with the rest of the stomach, nevertheless this presentation indicates that the extra effort of a thorough and careful examination of this region is often well compensated.

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## DISCUSSION

LOUIE FELGER, M. D. (1930 Wilshire Boulevard, Los Angeles).—Lesions of the pars cardia of the stomach are responsible for many obscure and atypical symptoms referable to the lower part of the thorax and the upper part of the abdomen. The pars cardia is a relatively silent area, and there are no symptoms which are diagnostic of pathology in this location.

In diaphragmatic hernia the symptoms are due to impairment of respiration and circulation, or to disturbed function of the herniated abdominal organs. The increase in the recognition of diaphragmatic hernia is entirely due to marked advances in roentgenologic study. A survey of these cases shows that the diagnosis is rarely suspected by the clinician, these cases being diagnosed as gall-bladder disease, peptic ulcer, carcinoma of the stomach, intestinal obstruction, and heart disease. Three cases were hospitalized with hemoglobins of 15, 17, and 19 per cent, respectively, and regarded as hopeless carcinomas of the stomach. However, x-rays revealed diaphragmatic herniae with large ulcers in the herniated portion of the stomach.

It has been recommended that diaphragmatic herniae be looked for when the findings at surgery do not seem sufficient for intra-abdominal complaints. Many operations upon the gall-bladder, stomach, and appendix have been performed because of unrecognized diaphragmatic herniae.

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H. H. LISSNER, M. D. (1908 Wilshire Boulevard, Los Angeles).—The numerous diagnostic points brought out by Doctor Abowitz in his article open up a new field of thought not only from the standpoint of x-ray diagnosis, but also because they merit serious consideration from the clinician as an aid in clearing up certain problems which, under the older methods, have remained obscure.

It has been the custom of the clinician to refer his patients to the roentgenologist for certain studies and to accept the latter's report as *prima facie* evidence, for or against a given condition, without checking over the pictures together or correlating the x-ray with the clinical findings. Usually if the x-ray does not agree with the clinical diagnosis, it is the latter which is discarded and the former is accepted irrespective of the clinical evidence in its favor. The fixing of the mind upon a definite organ to be studied, and the centering of thought upon a certain part of that organ, and not considering it as a whole, have caused many errors to creep in between the x-ray findings and the clinical diagnosis of a disease. This error is best exemplified in the study of the stomach. If the internist asks for a gastro-intestinal series, the pylorus of the stomach is the part usually studied and we are shown a series of photographs taken at various time intervals representing the function of the pylorus. If these photographs are reported as being negative, the internist begins to look about for another peg upon which to hang his clinical diagnosis. However, by looking at the organ as a whole we have been able to develop a relationship between the roentgenological and the clinical aspect of the patient's discomfort, which is just as essential to the patient's welfare as is good teamwork between the surgeon and his trained assistant. The studies of the cardiac end of the esophagus, and of the pars cardia, under this scheme of cooperation have resulted in picking up several cases of carcinoma of the stomach in this region which had been overlooked in a number of previous x-ray studies. The diagnostic points outlined by the author are invaluable aids to a better reading of the x-ray studies of the stomach, and should bring to the fore the fact that stomach symptoms are caused by

lesions in this organ in its so-called "silent area," even though the esophagus or the pylorus are not primarily involved.

Another very important point brought out by Doctor Abowitz is the presence of an air bubble or shadow behind the heart in diaphragmatic hernia. If the hernia is large, the usual distortion of the magen blase is seen to the left of the heart shadow; but in some instances where the hernia is small the shadow generally will cause a lighting up of the usual cardiac silhouette. Here again I wish to emphasize that the fixing of the mind focus upon the heart itself and the elimination of the rest of the chest content from the mental picture.

Cases of diaphragmatic hernia have been suspected upon attempting to explain this shadow, and upon further barium studies have been proved to be hernia. The cardiac symptoms produced by this lesion vary with the patient and the size of the hernia. Dyspnea, after a big meal, is an outstanding symptom, and is dependent upon the size of the hernia and the amount of cardiac displacement. Precordial pain is not a prominent symptom.

The pouch of the pars cardia is a very interesting condition and one that at times is the cause of great concern to the patient, because of the drumming sound which frequently accompanies it. As might be suspected, the sound varies from that of a drumming character to a more musical or kettle-drum sound, or even at times has a bell tone. It can be controlled by changing the position of the patient from the left to the right side.

The diagnostic data brought out in Doctor Abowitz's paper will, I hope, stimulate a closer liaison between the roentgenologist and the clinician, and will open our eyes to the rest of the x-ray pictures, besides the study of the particular organ for which it was taken.

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DOCTOR ABOWITZ (Closing).—Since the presentation of the above paper, I have observed the following case:

In examining a chest film, I noticed a somewhat opaque spherical shadow in the region of the heart, measuring about three inches in diameter. Several diagnostic possibilities presented themselves: (1) aneurysm of the thoracic aorta; (2) a mediastinal new growth; (3) a mediastinal abscess; (4) diaphragmatic hernia; or (5) a dilated esophagus. The clinical signs and symptoms offered no help in diagnosis. The fluoroscopic examination in the left oblique vertical position showed the left border of the spherical shadow protruding beyond the left side of the heart, and not pulsating. The fluoroscopic observation after the administration of a barium mixture revealed a diaphragmatic hernia with the pars cardia of the stomach above the diaphragm. The walls of the herniated protrusion were thickened and adherent in the posterior mediastinum. The esophagus, which was normal in shape, stopped short just above the diaphragm.

## TREATMENT OF EXOPHTHALMIC GOITER\*

By H. ROSS MAGEE, M.D.  
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DISCUSSION by John C. Ruddock, M.D., Los Angeles;  
A. B. Cooke, M.D., Los Angeles.

FOR the control of exophthalmic goiter we have two therapeutic weapons of proved value: (1) the administration of iodine, and (2) resection of the thyroid gland. Partial destruction of the thyroid gland by roentgen rays has also been found to be of some value, although its beneficial results often prove to be only temporary. J. H. Means and his associates<sup>2,3</sup> at the Massachusetts General Hospital have reported favorable results in a considerable number of cases in which patients were treated by roentgen rays.

\* Read before Santa Monica Branch of Los Angeles County Medical Society, Santa Monica, California, April 9, 1935.